

$$\underline{20)} \left(\frac{27}{8}\right)^{-\frac{1}{3}} = \left(\frac{8}{27}\right)^{\frac{1}{3}}$$

$$\frac{8^{\frac{1}{3}}}{27^{\frac{1}{3}}} = \frac{2}{3}$$

Bellwork: 5/7/13

Express using rational exponents:

$$1) \sqrt[4]{5x^2y^3z} = 5^{\frac{1}{4}}x^{\frac{2}{4}}y^{\frac{3}{4}}z^{\frac{1}{4}}$$

Express in radical form:

$$2) \cancel{x^{\frac{3}{4}}}x^{-1/2}y^{3/4} = \sqrt[4]{x^2y^3}$$



Evaluate:

$$3) -(64)^{(2/3)}$$

-16

$$4) 27^{(4/3)}$$

81

* to solve, bases must be the same! *

$$\text{If } b^x = b^y, \text{ then } x = y.$$

Solving Exponential Equations

Examples:

1. $2^{2x+1} = 2^{3x-2}$

$$\begin{array}{r} 2x+1 = 3x-2 \\ -2x+2 \quad -2x+2 \\ \hline 3 = x \end{array}$$

2. $10^{3x+5} = 10^{x-3}$

$$\begin{array}{r} 3x+5 = x-3 \\ -x-5 \quad -x-5 \\ \hline 2x = -8 \\ \boxed{x = -4} \end{array}$$

Practice:

1. $2^5 = 2^{2x-1}$

2. $5^x = 5^{3x+4}$

$$\text{If } b^x = b^y, \text{ then } x = y.$$

* THINK POWERS!

* changing base to the smaller number *

3. $2^{5x-6} = 4^{x+6}$

$$\begin{array}{r} \downarrow \\ 2^{5x-6} = 2^{2(x+6)} \\ 5x-6 = 2x+12 \\ -2x+6 \quad -2x+6 \\ \hline 3x = 18 \quad \boxed{x = 6} \end{array}$$

4. $9^{x+1} = 27^{x-1}$

$$\begin{array}{r} 3^{2(x+1)} = 3^{3(x-1)} \\ 2x+2 = 3x-3 \\ -2x+3 \quad -2x+3 \\ \hline 5 = x \end{array}$$

3. $3^x = 9^{x+1}$

$$\begin{array}{r} 3^x = 3^{2(x+1)} \\ x = 2x+2 \\ -2x-2x \\ \hline -x = 2 \quad \boxed{x = -2} \end{array}$$

4. $4^{2x-1} = 8^{x+5}$

$$\begin{array}{r} 2^{2(2x-1)} = 2^{3(x+5)} \\ 4x-2 = 3x+15 \\ -3x+2 \quad -3x+2 \\ \hline x = 17 \end{array}$$

Solve for x .

1.) $5^{4x-1} = 5^{x-2}$

2.) $7^{4x-3} = 7^{2x+1}$

3.) $8^{x-4} = 8^{5x+8}$

4.) $10^{4x-5} = 10^{x+4}$

5.) $9^x = 3^{x+1}$

6.) $2^{x-1} = 4^x$

7.) $8^{x+2} = 16^x$

8.) $9^{3x} = 81^{x-4}$

9.) $16^{2-x} = 32^{2x}$

10.) $27^{2x-3} = 81^{4-x}$

11.) $25^{3-x} = 125^{2x-1}$

12.) $8^{4x-7} = 64^{x-3}$

Algebra 2 5.0
Solving Exponential Equations #2

Name: _____

Date: _____ Pd

Solve for x.

1.) $3^x = 3^{3x+1}$

2.) $5^{3x+4} = 5^x$

3.) $3^x = 9^{x+1}$

4.) $2^5 = 2^{2x-1}$

5.) $8^{x-1} = 16^{3x}$

6.) $9^{3x} = 27^{x+2}$

7.) $25^{2x} = 125^{x-3}$

8.) $2^{2x-1} = 8^{x+7}$

9.) $2^{x+1} = 32$

$$2^{x+1} = 2^5$$

$$x+1 = 5$$

$$\boxed{x = 4}$$

10.) $4^{x-1} = 8^x$

11.) $7^{2x-1} = 49^{x-3}$

$$7^{2x-1} = 7^{2(x-3)}$$

$$\cancel{2x} - 1 = \cancel{2x} - 6$$

$$-1 = -6$$

no solution!

12.) $100^{2x} = 10^{3x+2}$

13.) $64^{x-1} = 4$

$$4^{3(x-1)} = 4^1$$

$$3x-3 = 1$$

$$3x = 4$$

$$\boxed{x = \frac{4}{3}}$$

14.) $8^{2x+3} = 64^{x-5}$

15.) $25^{3-x} = 5^{2x+1}$

Homework:

pgs 6 + 7 → evens!

